Tanner himself has sent in two maps of this region derived from native sources, and both upset maps previously accepted, and it is highly improbable that we have any but the most rudimentary and vague knowledge of the course of the Sanpo below Gyala Sindong, and not even that of the course or limits drained by the Dibong. Colonel Tanner then referred in some detail to the great rivers that have their sources in the Himalayas, and concluded by giving some advice to tourists as to the best routes to take.

SCIENTIFIC SERIALS.

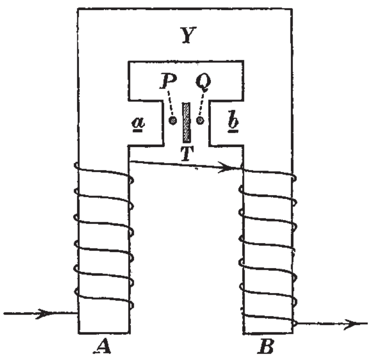
The numbers of the *Journal of Botany* for February, March, and April, do not contain many articles of interest to those not concerned with systematic botany. Miss Barton has an interesting note on the occurrence of structures which have the appearance of galls on a common red seaweed, *Rhodymenia palmata.* Very few examples of this phenomenon have hitherto been described in connection with Algæ. Messrs. Britten and Boulger's biographical index of British and Irish (*sic*) botanists is now nearly completed, and we are glad to see that the editor of the *Journal* has not yet abandoned the idea of reprinting it in a separate form.

In the *Botanical Gazette* for February, Dr. D. H. Campbell continues his useful series of papers on the histology of the higher Cryptogams, with a note on the apical growth of *Osmunda* and *Botrychium,* in which he shows the large range of variation on this point within the Osmundaceæ.—In the March number, Mr. G. F. Atkinson discourses on the black rust of cotton, a disease due to the attacks of several parasitic fungi, of which the most destructive is *Cercospora Gossypina.*

SOCIETIES AND ACADEMIES.

London.

Physical Society, April 17.—Prof. W. E. Ayrton, F.R.S., President, in the chair.—The following communications were made:—On a property of magnetic shunts, by Prof. S. P. Thompson. After referring to a few instances in which magnetic shunts are employed, as, for example, the ordinary magnetic medical coil, and Trotter's constant current dynamo, he said that the particular property he wished to speak of was the time taken for such a shunt to lose its magnetism, as compared with the other branch of the magnetic circuit. If these times were very different, unexpected results might be produced, and these might be regarded as being due to a kind of magnetic time-constants. Short pieces, as was well known, demagnetize much more rapidly than long ones, particularly if the latter form, or be part of, a closed magnetic circuit. Hence, in alternators, such as Kingdon's keeper dynamo, in which both magnets and armature are stationary, it was important that the revolving keepers should be short. The most important application of a magnetic shunt occurred, he said, in D'Arlincourt's relay, described in vol. iv. of the Journal of the Society of Telegraph Engineers and Electricians, and shown diagrammatically in the figure. In this relay the polarized tongue T plays between two projections, *a* and *b*, near the yoke Y, and it is claimed to have a quicker action than ordinary kinds. The reason of this the author explained as follows. When a current flows through the coils, the greater part of the magnetic lines pass through the yoke, but a few leak across from *a* to *b*, and move the tongue against the contact P. On stopping the current, the magnetism in the extremities A and B dies away much more rapidly than in the yoke; consequently, the direction of the field between *a* and *b* is reversed, and the tongue T thrown back against the stop Q. Prof. Perry asked if any experiments had been made to test whether the throwing back actually occurred. He also inquired whether such action would be augmented, or otherwise, by having a thick copper tube round the yoke, or by laminating the iron. Mr. Blakesley asked if placing a yoke across A B would not improve the action. The President said he would be glad to know whether the relay was any more sensitive than an ordinary one as regards the ampere-turns or the watts required to actuate the instrument. In India, he remembered that they used inductive coils shunting the ordinary relays, in order to expedite the action and to avoid confused signals arising from the electrostatic capacity of long lines. In reply, Prof. Thompson said he had tried an experiment on a horseshoe electromagnet, and found evidence of throwing back when working near the bend or yoke. Putting a yoke across A B would, he thought, tend to neutralize the effect desired.—An alternating current influence machine, by James Wimshurst. This machine consists of a varnished glass disk, with or without metallic sectors, mounted on an axis, and rotating within a square wooden frame fixed in the plane of the disk. The frame carries four square glass plates, each of which has one corner cut away so as to clear the boss of the disk. These plates are placed one at each corner of the frame, alternately on the two sides, and the disk revolves between them. There are thus two plates on one side of the disk situated at opposite ends of a diagonal of the frame, and two on the other side of the disk, at opposite ends of the other diagonal. Tin-foil sectors fixed to the outer sides of the plates act as inductors, and wire brushes connected with them touch the disk about 90° behind the centre of the inductors. The peculiarity of the machine is that, although sparks can be readily obtained from it, a Leyden jar cannot be charged by bringing it to one of the terminals. From this the author concluded that the electricity produced was alternately of positive and negative sign, and this he showed to be the case by means of an electroscope. The alternations, he said, occurred about every three-quarters of a revolution, the suspended paper disks which he used as an electroscope remaining apart for that period and collapsing during the next quarter of a turn. Using disks with various numbers and sizes of sectors, the author finds that the smaller the sectors and the fewer the number the greater the quantity of electricity produced. Plain varnished glass is the best in this respect. Such a disk, however, does not excite itself quite so freely as one having numerous metallic sectors. By removing two of the inductors and placing an insulating rod carrying collecting brushes at its ends, across a diameter of the disk, the machine was used to produce direct currents. Numerous disks and various shaped inductors accompanied the machine, by means of which a Holtz, Voss, or ordinary influence machine could be imitated. Prof. S. P. Thompson congratulated the author on the most interesting and puzzling machine he had brought before the Society. He inquired if the machine would work if the direction of rotation was reversed, or if two of the inductors were removed, and also whether all the four inductors are electrically of the same sign at the same instant. In reply, Mr. Wimshurst said the machine would not excite if the direction of rotation be changed without also changing the direction of the brush arm, but it would work as a direct current machine when two inductors were removed.—On erecting prisms for the optical lantern, and on a new form of erecting prism made by Mr. Ahrens, by Prof. S. P. Thompson. The ordinary form of erecting prism, viz. a right-angled isosceles one, was, the author pointed out, open to the objection that the top halves of the faces inclosing the right angle were nearly useless, for only the light which, after the first refraction is totally reflected by the hypotenuse face, can be utilized. The fraction of the side which is useful varies with the refractive index, being 0·46 when $\mu = 1\cdot5$, and 0·525 when $\mu = 1\cdot65$. To increase these proportions, prisms with angles of 105° and 126° have been used by Wright and others, and in some cases the prisms have been truncated. With such large angles, much light is lost by reflection. Bertin employed two truncated right-angled prisms placed base to base with an air-film between them. Nachet has also



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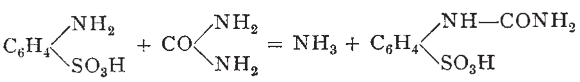
made erecting prisms for microscopes in which internal reflection occurs from faces inclined at an angle of 81° to each other. This form of prism suggested to Mr. Ahrens the new form now shown, which may be described as a long right-angled prism whose ends are cut off so as to be parallel to each other and inclined at 45° to the hypotenuse face. The longitudinal acute angles not being required, are truncated. Light falling parallel to the axis, on one end of the prism is refracted, and after internal reflections, emerges parallel, but perverted. It is claimed that this form of prism gives, weight for weight, a larger angular field than any previously made. The performance of the new form of prism, and also of the ordinary forms, was tested before the Society.—At the close of the meeting, Dr. Atkinson, who had taken the chair, announced that the next meeting would be held at Cambridge on May 9, instead of May 8, as previously intended.

PARIS.

Academy of Sciences, April 20.—M. Duchartre in the chair.—On some calorimetric data, by M. Berthelot. (1) Aspartic acid and its mixed function. This acid is a bibasic acid in which the heat of neutralization for the first addition of a molecule of NaOH is about four times that for the second; this unequal heat liberation is connected up by the author with the presence in the molecule of the (NH_2) group. (2) Malonic chloride. (3) The formation of isomeric soluble and insoluble tartrates.—On the crystalline form and optical properties of M. Engel's new variety of sulphur, by M. C. Friedel.—An excursion from the Arago Laboratory to Rosas, Spain, by M. de Lacaze-Duthiers. An account is given of a zoological excursion into Spain taken by the pupils of the Arago Laboratory during the Easter holidays. —On the endothelium of the peritoneum, and some modifications which it undergoes during experimental inflammation; how we must understand the recovery of wounds by immediate healing, by M. L. Ranvier.—New nebulæ discovered at Paris Observatory, by M. G. Bigourdan. The list now given is in continuation of previous ones, and includes thirty-five newly-discovered objects between 16 hours and 24 hours of right ascension.—On the deformation of spiral surfaces, by M. L. Raffy.—On the theory of light, by M. C. Raveau.—Dissociation of amylene hydrobromide under reduced pressures, by M. Georges Lemoine. The conclusion is drawn that in the case of this body "dissociation is facilitated by a diminution of pressure." The curves given show the relationship between dissociation at $\frac{1}{10}$ atmosphere and that at the ordinary atmospheric pressure.—On the preparation and the reaction of ammoniacal chlorides of mercury, by M. G. André.—On the sub-salts of silver, by M. Güntz. Starting from the perfectly definite and crystallized sub-fluoride, Ag_2F, previously prepared by the author, the salts Ag_2Cl, Ag_2I, Ag_4S, have now been obtained, and their composition established by the analyses given.—On the sulphide of boron, by M. Paul Sabatier. The heat of formation of this body (prepared by the method of Sainte-Claire Deville and Wöhler) is found to be 82·6 calories; less than that of the oxide or chloride.—On boron hydride, by M. Paul Sabatier.—On two new forms of sulphur, by M. Engel.—A strong solution of sodium thiosulphate is decomposed by strong HCl; the filtrate on standing becomes yellow; extracted with $CHCl_3$ and the extract evaporated, orange-yellow crystals of the rhombohedral system are obtained. A variety of sulphur soluble in water is also described.—Action of urea on sulphanilic acid, by M. J. Ville. The following equation sums up the results obtained—



$$C_6H_4\left\langle\begin{matrix}NH_2\\SO_3H\end{matrix}\right. + CO\left\langle\begin{matrix}NH_2\\NH_2\end{matrix}\right. = NH_3 + C_6H_4\left\langle\begin{matrix}NH—CONH_2\\SO_3H\end{matrix}\right.$$

—New combinations of metallic sulphites with the aromatic amines, by M. G. Denigès.—Estimation of acetone in methylated alcohols, by M. Léo Vignon.—On the purification of industrial waters and sewage, by MM. A. and P. Buisine. The authors propose the use of ferric sulphate as a purifying agent. —Contribution to the history of fecundation, by M. Hermann Fol. The changes which two corpuscles of the ovule undergo after fecundation are described.—On the gustatory organs of the sea-devil (*L. piscatorius*), by M. Frédéric Guitel.—On the innervation of the proboscis of Glycera or Rhynchobolus, by M. E. Jourdan.—On an artificial melanine, by M. Georges Pouchet. The author has prepared a body which has the general properties of the black matter in the blood known as melanine.—New researches on olfactometry, by M. Charles Henry.—On the assimilation of lichens, by M. Henri Jumelle. Numerous experiments lead the author to the conclusion that when certain favourable conditions of light, humidity, and season are realized, all lichens are capable of decomposing the carbon dioxide in the air very energetically, notwithstanding their respiration of carbon dioxide. Lichens thus increase in carbon. It is also shown that, *cæteris paribus*, direct sunlight is preferable to diffused light.—Influence of salinity on the quantity of starch contained in the vegetable organs of *Lepidium sativum*, by M. Pierre Lesage. The experiments indicate that when plants are watered with solutions containing from 12 to 15 grams of salt per litre the starch disappears completely. The diminution of starch is not proportional to the increase of salinity.—On some rye possessing peculiar poisonous properties, by M. Prillieux.—On the discovery of a spring at the bottom of the Annecy Lake, by MM. A. Delebecque and L. Legay.—On the soundings executed in the Pas-de-Calais in 1890, by M. J. Renaud.—On the metamorphic rocks of the Savoy Alps, by M. P. Termier.—Contribution to the study of the culture of colza, by MM. E. Louise and E. Picard.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

An Introduction to the Study of Mammals: W. H. Flower and R. Lydekker (Black).—Forty Years in a Moorland Parish: Rev. J. C. Atkinson (Macmillan).—Elementary Text-book of Botany: E. Aitken (Longmans).—Proceedings of the Seventh Annual Convention of the Association of Official Agricultural Chemists (Washington).—The Missouri Botanical Garden (St. Louis).—Die Organisation der Turbellaria Acocla: Dr. L. von Graff (Leipzig, Engelmann).—A History of Chemistry: Dr. E. von Meyer; translated (Macmillan).—The Best Books: W. S. Sonnenschein; 2nd Edition (Sonnenschein.—General Report on the Operations of the Survey of India Department, 1888–89 (Calcutta).—Grundzüge der Geologie und Physikalischen Geographie von Nord-Syrien: Dr. M. Blanckenhorn (Berlin, Friedländer).—Ueber den Schädel eines fossilen dipnoërs Ceradotus Sturii, nov. sp.: F. Teller (Wien, Hölder).—Coal, and what we get from it: R. Meldola (S.P.C.K.)—Eighteen Years of University Extension: R. D. Roberts (Cambridge University Press).—The Monist, vol. i., No. 3 (Watts). —Willing's British and Irish Press Guide (Willing).

CONTENTS.

PAGE

The Science Museum and Gallery of British Art at South Kensington 601
County Councils and Technical Education 602
Philip Henry Gosse. By E. P. W. 603
A Class-book on Light 606
The Philosophy of Surgery 606
Our Book Shelf:—
  Taylor: "Euclid's Elements of Geometry," Books III. and IV. 607
  "Zoological Articles contributed to the 'Encyclopædia Britannica'" 607
  Baker: "The British Empire: the Colonies and Dependencies" 607
Letters to the Editor:—
  The *Rôle* of Quaternions in the Algebra of Vectors.—**Prof. P. G. Tait** 608
  The Influenza.—**E. Armitage** 608
  Antipathy [?] of Birds for Colour.—**William White** 608
  A Meteor.—**W. Budgen** 608
On Tidal Prediction. (*Illustrated.*) **By Prof. G. H. Darwin, F.R.S.** 609
The Photographic Chart of the Heavens 615
Magnetic Anomalies in France. By M. Mascart; Prof. A. W. Rücker, F.R.S. 617
Notes 618
Our Present Knowledge of the Himalayas 621
Scientific Serials 623
Societies and Academies 623
Books, Pamphlets, and Serials Received 624

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